

WHAT IS CLAIMED IS:

1. A terminal apparatus for an operator used when
connected to an arbitrary node in a network system
including a plurality of ring networks each of which
5 includes a plurality of nodes connected to each other
through a communication line,

said terminal apparatus for an operator
comprising:

a display unit;
10 operating means for accepting click operations by
a user;

information acquiring means for acquiring from
a connected node notification information concerning
a ring network to which said node belongs;

15 information processing means for managing
occurrence statuses of failures in said network system
based on said notification information acquired by said
information acquiring means; and

display controlling means for displaying
20 information processed by said information processing
means on said display unit,

wherein said display controlling means displays
a node icon associated with each node belonging to
a ring network to which a node connected with its own
25 apparatus belongs,

displays a line associated with said communication
line between said node icons on said display unit, and

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displays a view showing a card configuration of said clicked shelf in said second window in said display unit, and

displays a plurality of cards shown in said view of a card configuration in display modes which differ from each other depending on presence/absence of a failure in each card.

5 4. A terminal apparatus for an operator used when connected to an arbitrary node in a network system including a plurality of ring networks each of which includes a plurality of nodes,

 said terminal apparatus for an operator
10 comprising:

 a display unit;

 operating means for accepting click operations by
a user;

 information acquiring means for acquiring from
15 a connected node notification information concerning a ring network to which said node belongs;

 information processing means for managing statuses of said network system based on said notification information acquired by said information acquiring
20 means; and

 display controlling means for displaying information processed by said information processing means on said display unit,

 wherein said display controlling means displays
25 a third window on a screen of said display unit, and

 displays in said third window a list of said notification information acquired by said information

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acquiring means in a text format together with a plurality of attributes characterizing each set of said notification information.

5 5. The terminal apparatus for an operator according to claim 4, wherein said display controlling means displays a first button on said screen of said display unit,

10 displays a fourth window on said screen of said display unit when said first button is clicked by said operating means,

15 displays in said fourth window an attribute specification section for arbitrarily selecting and specifying a plurality of said attributes, and selectively displays in said first window notification information having attributes specified in said attribute specification section.

20 6. The terminal apparatus for an operator according to claim 4, wherein said display controlling means displays a second button on said screen of said display unit,

displays a fifth window on said screen of said display unit when said second button is clicked by said operating means,

25 displays in said fifth window a section for setting an order of displaying said attributes in said third window, and

rearranging said order of said attributes

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displayed in said third window in accordance with
an order set in said section.

7. The terminal apparatus for an operator
according to claim 4, wherein said display controlling
5 means displays a third button on said screen of said
display unit,

displays a sixth window on said screen of said
display unit when said third button is clicked by said
operating means,

10 displays in said sixth window a list of nodes
which are management targets of its own apparatus; and
wherein, when one or a plurality of nodes
displayed in said sixth window are specified by said
operating means, said information acquiring means masks
15 alarm information included in notification information
transmitted from said specified nodes.

8. The terminal apparatus according to claim 4,
further comprising: an informing buzzer which sounds
under predetermined conditions; and

20 buzzer controlling means for controlling sounding
of said informing buzzer,

wherein said display controlling means displays
a fourth button on said screen of said display unit,

25 displays a seventh window on said screen of said
display unit when said fourth button is clicked by said
operating means, and

displays in said seventh window a condition

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setting section for setting conditions for sounding
said informing buzzer; and

wherein said buzzer controlling means sounds said
informing buzzer under conditions set in said condition
5 setting section in said seventh window.

9. A terminal apparatus for an operator used when
connected to an arbitrary node in a network system
including a plurality of ring networks,

each of said ring networks including a plurality
10 of nodes,

each node including storing means for accumulating
a history of notification information concerning
network management,

said terminal apparatus for an operator
15 comprising:

a display unit;

operating means for accepting click operations by
a user;

information acquiring means for acquiring from
20 a connected node notification information concerning
a ring network to which said node belongs;

information processing means for managing statuses
of said network system based on said notification
information acquired by said information acquiring
25 means; and

display controlling means for displaying
information processed by said information processing

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displays a 10th window on said screen of said display unit when said fifth button is clicked by said operating means,

selectively displays in said ninth window

5 notification information having attributes specified in
said attribute specification section.

10 wherein said display controlling means displays
a sixth button on said screen of said display unit,

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15      displays in said 11th window:
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20 a section for individually setting the size of
said storage resource area of a notification
information history to be accumulated; and

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12. A terminal apparatus for an operator used when

connected to an arbitrary node in a network system,
said network system including a plurality of ring
networks,

5 each of said ring networks including a plurality
of nodes,

each node including storing means for accumulating
a history of notification information including at
least quality information concerning communication
quality in said network system,

10 said terminal apparatus for an operator
comprising:

a display unit;

operating means for accepting click operations by
a user;

15 information acquiring means for acquiring from
a connected node notification information concerning
a ring network to which said node belongs;

information processing means for managing statuses
of said network system based on said notification
20 information acquired by said information acquiring
means; and

display controlling means for displaying
information processed by said information processing
means on said display unit,

25 wherein said display controlling means displays
a seventh button on a screen of said display unit,
displays a 12th window on said screen of said

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displays in said 12th window a retrieval condition
specification section for specifying retrieval
5 conditions for retrieving desired notification
information from a history accumulated in said storing
means;

wherein said display controlling means displays
in said 12th window said notification information
retrieved by said information processing means in
15 a text format together with a plurality of attributes
characterizing said retrieved notification information.

displays a 13th window on said screen of said display unit when said eighth button is clicked by said operating means, and

displays in said 13th window:

25 an operation target specification section for
specifying a node as an operation target and a channel
and a section thereof;

a section for specifying whether notification is performed in accordance with each type of quality information measured with respect to an operation target specified in said operation target specification section;

a section for setting a level of importance in accordance with each type of quality information measured with respect to an operation target specified in said operation target specification section; and

a section for setting a threshold value used when performing notification for quality information measured with respect to an operation target specified in said operation target specification section; and

wherein said information processing means informs a node as said operation target of the content specified in said 13th window and informs said node of quality information in accordance with said content.

14. A terminal apparatus for an operator used when connected to an arbitrary node in a network system including a plurality of ring networks, each of said ring networks including a plurality of nodes,

said terminal apparatus for an operator comprising:

a display unit;

information acquiring means for acquiring notification information respectively transmitted from a plurality of said nodes;

information processing means for managing occurrence statuses of alarms in said network system based on said notification information acquired by said information acquiring means; and

5 display controlling means for displaying information processed by said information processing means on said display unit,

wherein said display controlling means displays a ninth button on a screen of said display unit,

10 displays a 14th window on said screen of said display unit when said ninth button is clicked by said operating means,

displays in said 14th window:

15 a first section for specifying an operation target which is on a level of urgency of said alarm; and

a second section for selecting an occurrence cause of said alarm for said operation target specified in said first section, and

20 reads a current set state of a level of urgency of said specified occurrence cause of said alarm with respect to a node having said operation target and displays a list of reading result in accordance with each occurrence cause when said operation target and said occurrence cause are specified in said 14th
25 window; and

wherein said information processing means causes an operator of its own apparatus to individually set

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a level of urgency in accordance with each occurrence cause of said alarm displayed in said list in said 14th window, and

5 sets a level of urgency in accordance with each set occurrence cause of said alarm with respect to a node as said operation target.

10 15. The terminal apparatus for an operator according to claim 14, wherein said display controlling means displays a 10th button on said screen of said display unit,

displays a 15th window on said screen of said display unit when said 10th button is clicked by said operating means, and

15 displays in said 15th window a section for causing an operator of its own apparatus to specify a node as an operation target and a shelf thereof and set transmission or non-transmission of a maintenance signal to said specified operation target in said 15th window; and

20 wherein said information processing means sets the content set in said 15th window to a node including said operation target.

25 16. The terminal apparatus for an operator according to claim 14, wherein said display controlling means displays an 11th button on said screen of said display unit,

displays a 16th window on said screen of said

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display unit when said 11th button is clicked by said operating means,

displays in said 16th window a section for causing an operator of its own apparatus to specify a node as an operation target and a shelf thereof and set a threshold value of an alarm indicative of signal quality degradation with respect to said specified operation target, and

sets said threshold value set in said section to a node including said operation target.

17. A terminal apparatus for an operator used when connected to an arbitrary node in a network system,

said network system including a plurality of ring networks,

each of a plurality of said ring networks including a plurality of nodes and a traffic bypass function,

a plurality of said nodes being connected to each other in a ring form through a communication line in which a plurality of paths are multiplexed,

said communication line including a working system line and a preliminary line,

said traffic bypass function for causing service traffic transmitted through said working system line to make a detour to said preliminary line,

said terminal apparatus for an operator comprising:

a display unit;

information acquiring means for acquiring from
a connected node notification information concerning
a ring network to which said node belongs;

5 information processing means for managing statuses
of said traffic bypass function in said network system
based on said notification information acquired by said
information acquiring means; and

display controlling means for displaying
10 information processed by said information processing
means on said display unit,

wherein said display controlling means displays
a 12th button on a screen of said display unit,

displays a 17th window on said screen of said
15 display unit when said 12th button is clicked by said
operating means, and

displays in said 17th window an arrow associated
with each path in a target ring network.

18. The terminal apparatus for an operator
20 according to claim 17, wherein said display controlling
means displays a 13th button on said screen of said
display unit,

displays an 18th window on said screen of said
display unit when said 13th button is clicked by said
25 operating means, and

displays in said 18th window a section for causing
an operator of its own apparatus to specify a

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transmission interval as an operation target and causing an operator of its own apparatus to set values of parameters concerning said traffic bypass function with respect to said specified operation target; and

5 wherein said information processing means sets said values set in said section with respect to a node concerning said operation target.

19. The terminal apparatus for an operator according to claim 17, wherein said display controlling
10 means displays information indicative of a destination to which a path corresponding to said arrow displayed in said 17th window is dropped in association with said arrow.

20. The terminal apparatus for an operator according to claim 19, wherein said information
15 indicative of a destination to which a path is dropped includes at least a low-speed side channel number to which said path is dropped and information indicative of a type of concatenation of said path.

20 21. A communication path setting method in a terminal apparatus for an operator including a display unit in a network system,

 said network including a plurality of ring networks, each of said ring networks including a
25 plurality of nodes which are connected to each other in a ring form through a communication line in which a plurality of communication paths are multiplexed,

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a third step of displaying an arrow associated with said communication path to be set in a display area corresponding to a node interval specified in said first and second steps;

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a sixth step of causing a node which has accepted

said request for setting a communication path to form a new communication path based on said request.

22. The communication path setting method according to claim 21, wherein said first and second steps also perform specification of a type of concatenation of said communication path to be set in addition to specification of a low-speed side channel of a node.

23. The communication path setting method according to claim 21, wherein, when said communication path to be set is a dual homing path,

said method further including a seventh step of specifying a low-speed side channel of a node as an intermediate drop point of said communication path to be set; and

wherein said first, second and seventh steps also perform setting in accordance with each type of node in addition to specification of a low-speed side channel of a node.

24. The communication path setting method according to claim 21, wherein said communication line includes a working system line and a preliminary system line; and

wherein, when each of a plurality of said ring networks includes a traffic bypass function for causing service traffic transmitted through said working system line to make a detour to said preliminary system line,

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said terminal apparatus for an operator comprising:

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operating means for accepting click operations by
a user;

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display controlling means for display information
processed by said information processing means on said
display unit,

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wherein said display controlling means displays
a 14th button on a screen of said display unit,

displays a 19th window on said screen of said display unit when said 14th button is clicked by said operating means, and

5 displays in said 19th window a section for causing an operator of its own apparatus to select one of nodes existing in said network system and specify a board of said selected node; and

10 wherein said information processing means deletes said board selected in said 19th window from supervisory control targets of its own apparatus.

26. The terminal apparatus for an operator according to claim 25, wherein said display controlling means displays a 15th button on said screen of said display unit,

15 displays a 20th window on said screen of said display unit when said 15th button is clicked by said operating means, and

20 displays in said 20th window a section for causing an operator of its own apparatus to specify an arbitrary node and specify a type of notification information transmitted from said specified node; and

25 wherein said information processing means reads set states of destinations of said notification information specified in said 20th window from said specified node and displays a list of said set states in said 20th window,

causes a user to set allowance or inhibition of

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5 respect to said specified node.

10 said terminal apparatus for an operator
 comprising:

wherein said display controlling means displays
a 16th button on a screen of said display unit,
displays a 21st window on said screen of said
display unit when said 16th button is clicked by said
operating means, and

displays in said 21st window a list of operators who are allowed to login to its own apparatus while

associating a name of each operator with an expiration date of a password and an access level of said each operator.

28. The terminal apparatus for an operator
5 according to claim 27, wherein said display controlling
means displays a 17th button on a screen of said
display unit,

displays a 22nd window on said screen of said
display unit when said 17th button is clicked by said
operating means, and

displays in said 22nd window:

a section for causing an operator of its own apparatus to input his/her name; and

a section for causing said operator to input
15 his/her password and access level; and

wherein said information processing means newly registers said operator inputted in said 22nd window as a user whose can login to its own apparatus.

29. The terminal apparatus for an operator
20 according to claim 27, wherein said display controlling
means displays an 18th button on said screen of said
display unit,

displays a 23rd window on said screen of said
display unit when said 18th button is clicked by said
25 operating means, and

displays in said 23rd window a section for causing an operator of its own apparatus to select an arbitrary

node in said network system;

wherein said information processing means reads
a name of a terminal apparatus for an operator
registered in a node selected in said 23rd window from
said selected node; and

wherein said display controlling means displays in
said 23rd window a list of said name of said terminal
apparatus for an operator read by said information
processing means.

30. The terminal apparatus for an operator
according to claim 27, wherein said display controlling
means displays a 19th button on said screen of said
display unit,

displays a 24th window on said screen of said
display unit when said 19th button is clicked by said
operating means, and

displays in said 24th window:

a section for causing an operator of its own
apparatus to select an arbitrary terminal apparatus for
an operator in said network system; and

a section for causing an operator of its own
apparatus to set an access level with respect to said
terminal apparatus for an operator selected in said
section; and

wherein said information processing means
determines a node selected in said 24th window as
a control target of said terminal apparatus for

an operator selected in said 23rd window and registers it together with said selected access level.

31. A terminal apparatus for an operator used when connected to an arbitrary node in a network system including a plurality of nodes,

said terminal apparatus for an operator comprising:

a display unit;

information acquiring means for acquiring from a connected node notification information concerning said network system;

information processing means for managing said network system based on said notification information acquired by said information acquiring means; and

display controlling means for display information processed by said information processing means on said display unit,

wherein said display controlling means displays a 20th button on a screen of said display unit,

displays a 25th window on said screen of said display unit when said 20th button is clicked by said operating means,

displays in said 25th window:

a section for causing an operator of its own apparatus to select an arbitrary node in said network system;

a list of a current set status of an operation

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reference time in accordance with each node selected in said section; and

5 a section for causing a user to select an arbitrary apparatus from said list and causing a user to individually set an operation reference time with respect to said selected apparatus; and

wherein said information processing means sets said operation reference time set in said 25th window with respect to said selected node.

10 32. A terminal apparatus for an operator used when connected to an arbitrary node in a network system including a plurality of nodes,

said terminal apparatus for an operator comprising:

15 a display unit;

information acquiring means for acquiring from a connected node notification information concerning said network system;

20 information processing means for managing said network system based on said notification information acquired by said information acquiring means; and

display controlling means for displaying information processed by said information processing means on said display unit,

25 wherein said display controlling means displays a 21st button on said screen of said display unit, displays a 26th window on said screen of said

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display unit when said 21st button is clicked by said operating means,

displays in said 26th window color specification buttons in accordance with each possible state that
5 an object displayed on said screen of said display unit may enter,

displays a color pallet when an arbitrary one of said color specification buttons is clicked, and causes an operator of its own apparatus to set a display color
10 in a state corresponding to said color specification button, and

displays an object displayed on said screen of said display unit in a display color set in said color pallet.

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